

2015 Dietary Guidelines Advisory Committee Meeting 3

**Sponsored by the
U.S. Department of Health and Human Services (HHS)
U.S. Department of Agriculture (USDA)**

March 14, 2014

Meeting Summary

Friday, March 14, 2014

(8:00 a.m.)

Participants

Dietary Guidelines Advisory Committee (DGAC): Dr. Barbara Millen (Chair), Dr. Alice H. Lichtenstein (Vice-Chair), Dr. Steven Abrams, Dr. Lucile Adams-Campbell, Dr. Cheryl Anderson, Dr. J. Thomas Brenna, Dr. Wayne Campbell, Dr. Steven Clinton, Dr. Frank Hu, Dr. Miriam Nelson, Dr. Marian Neuhouser, Dr. Rafael Pérez-Escamilla, Dr. Anna Maria Siega-Riz, Dr. Mary Story

Co-Executive Secretaries: Dr. Richard Olson, Ms. Colette Rihane, Dr. Kellie O. Casavale, Dr. Shanthi Bowman

Others: Mr. Kevin Concannon, Dr. Don Wright, Ms. Jackie Haven, Dr. William H. Dietz, Dr. Deborah F. Tate, Dr. Sonia Angell, Mr. John Ruff

Welcome and Introduction of Expert Speakers

Dr. Richard Olson, Designated Federal Officer, Office of Disease Prevention and Health Promotion (HHS), called the third meeting of the 2015 Dietary Guidelines Advisory Committee (DGAC) to order at 8:00 am. Dr. Olson welcomed the meeting participants and opened the meeting, noting that over 880 individuals were registered to view the webcast live. All 14 members of the Committee were present. Dr. Olson noted that brief biographies for the Committee members were available at www.DietaryGuidelines.gov. He introduced the Federal staff at the table (listed above under participants) and noted there were additional Federal staff present in the periphery of the room. He reviewed that the agenda included four expert speakers in the morning followed by the subcommittee reports in the afternoon. Subcommittees would report on their work since the last public meeting (January 13-14, 2014). He noted that in this public meeting, the Committee would begin their discussions of the scientific evidence and the first draft conclusions would be presented for Committee discussion.

Dr. Olson added that the Committee plans to hold three more public meetings this calendar year to deliberate on their work and those dates will be posted on www.DietaryGuidelines.gov. He noted for the public that the presentations for the January meeting are now posted on the website, apologizing for the delay due to the requirement that all materials be “508 compliant” before they can be posted for the public.

Dr. Olson noted that it is expected that the Committee will complete its report by the end of calendar year 2014. The Departments will post the report for public comment, hold a public comment meeting on the report, and then develop the policy document, the *Dietary Guidelines for Americans, 2015*. The policy document is expected to be published by the end of calendar year 2015. He then turned the floor over to Dr. Story to introduce the first speaker.

Invited Expert Presentations

Effective Prevention of Obesity in Healthcare Settings: Barriers and Opportunities

Dr. William H. Dietz, Consultant, Institute of Medicine and Senior Advisor, Robert Wood Johnson Foundation, began his presentation by emphasizing that he would be focusing less on what the *Dietary Guidelines* are and more on how they are disseminated. He started with the socio-ecological model and noted that most of the work in obesity is done in the outer levels of the model, commenting that medical settings are among those with the smallest impact to date. In addition, he stated that we know relatively little about ways to deliver obesity interventions. He described the difference between prevention and treatment, noting literature demonstrating that only a relatively small calorie deficit is necessary to revert the mean body mass index (BMI) back to that of 1970. Dr. Dietz summarized that this calorie deficit could be achieved through policy or environmental changes to promote population level weight changes, but is not effective for severe obesity. Dr. Dietz added that current obesity treatment is not aligned with the severity or health-related cost of obesity and showed data which attributed 40% of obesity-related medical costs associated with individuals with a BMI greater than 35 kg/m² (grades I and II obesity).

Dr. Dietz reviewed the American Heart Association (AHA)/American College of Cardiology (ACC) intensive lifestyle intervention criteria that include a goal of 5-10 percent weight loss within 6 months from treatment that includes more than 14 visits with a health care provider. Recommendations include a 500 calorie/day deficit and more than 150 minutes of physical activity each week. While behavioral modifications are recommended, there is little detail on how to implement the strategies. He then presented some information on characteristics of innovative clinical approaches and factors related to long-term weight maintenance.

Dr. Dietz then discussed how to prepare providers to deliver care for obesity and chronic disease. He recommended starting with medical education to providers beyond just doctors and including nutrition within the medical school curriculum, which he noted is challenging. He noted movement to a new era, perhaps driven by the Affordable Care Act that is shifting to competency-based education, which is more practical and aimed at prevention. In a competency-

based education model, the center of the model is competencies/outcomes, and there are bi-directional arrows connecting health needs/health systems, assessment, and curriculum. General competencies highlighted in the literature include inter-department teams, linkages between public health/community and clinical work, and familiarity with information technology. Next, he showed the chronic care model that includes providers and health systems. He stressed that efforts in the clinical setting need to be complemented by environmental changes and that there is a need to fully integrate systems.

Dr. Dietz discussed barriers to the prevention and treatment of obesity, including bias and stigma, inadequate care systems, and lack of training, time, and reimbursement. He highlighted competencies relevant to obesity prevention and control including use of the appropriate terms for obesity (e.g., “children with obesity” rather than “obese children” to reflect the disease state). Dr. Dietz noted that the competencies necessary to implement the *Dietary Guidelines* include providers being knowledgeable of *Dietary Guidelines* recommendations and clinic and community integration of efforts for a wider and consistent dissemination of messages. Dr. Dietz closed noting the clinical area is the most hopeful area currently due to the Affordable Care Act, with new opportunities to focus on health promotion and disease prevention.

Discussion

Dr. Nelson asked Dr. Dietz if he felt there were good examples that integrate the medical system with the community environment. Dr. Dietz responded that he has been looking for examples, but has not identified any. He noted the example of the delivery of the Diabetes Prevention Program (DPP) in the YMCA, but clarified it is an example of a clinical intervention in a community setting.

Dr. Campbell asked for clarification on costs for overweight/obesity and noted that it appears the healthcare system is not aligned to address this well. Dr. Dietz responded that if the focus is on reducing numbers, most individuals with obesity are in grade I. If the focus is on reducing cost, efforts should be directed at individuals with severe obesity. Grade I obesity could likely be addressed at the primary care level and with policy changes. Dr. Campbell asked how the *Dietary Guidelines* could impact the greatest number of people and Dr. Dietz responded that targeting normal weight and overweight populations for dissemination would likely have the biggest impact.

Dr. Lichtenstein asked Dr. Dietz if there were alternative approaches for prevention and asked how the *Dietary Guidelines* could support those. Dr. Dietz noted the successful Look AHEAD trial. Dr. Lichtenstein asked if there are new directions for prevention programs and if the *Dietary Guidelines* could help to shepherd these programs forward. Dr. Dietz noted there has been a lot of movement around health promotion, including USDA’s policies which have a profound effect in schools (e.g., school breakfast). He also highlighted the work of the Healthy Weight Task Force to decrease overall calories in the food supply. Consistent with this, recent data suggest that BMIs may be decreasing in 2-5 year olds. He also noted the opportunity to incorporate the *Dietary Guidelines* into early childcare and schools and stated there is less research for the adult equivalent at worksites, especially in small and medium businesses.

Dr. Hu noted the debate about whether obesity is a disease or condition for children and asked for Dr. Dietz's opinion. Dr. Dietz defines obesity as a disease (i.e. a state of ill health) and noted that current designation of obesity does not correlate with treatment. Dr. Hu noted the stigma with obesity in children, and Dr. Dietz added that it is important to think about the terms used with patients. He recommended not using the term "obesity" because it is so stigmatized; instead "weight problem" could be used with a focus on health and wellness.

Dr. Story asked if there was an example in another country of the ideal integration of health systems into environments, and Dr. Dietz responded he did not have any examples. He noted the definition of integration is not being able to tell where the information is coming from and that it would be ideal to have both providers and community professionals speaking using the same terminology.

Dr. Anderson stated that Dr. Dietz showed that only a small calorie deficit is needed to reduce BMI levels and asked if he was aware of data that supports why there appears to be a decrease in obesity rates in 2-5 year olds. Dr. Dietz noted there may be several explanations, including WIC package changes and broad policy changes, among others and noted there is not enough information on implementation in early childcare settings.

Dr. Pérez-Escamilla noted that children younger than 2 years are not included in the current *Dietary Guidelines* and asked Dr. Dietz if it is important to include this age population. Dr. Dietz responded that it is critically important to include this population, noting behaviors during pregnancy can affect later risk factors. Dr. Dietz shared that he hopes there is more information available for the 2020 *Dietary Guidelines* on how best to deliver strategies in that population.

Dr. Siega-Riz noted that meal replacements are successful in weight loss maintenance studies and asked if the *Dietary Guidelines* have failed in teaching people how to eat healthy low calorie meals. Dr. Dietz noted that a liquid diet is "easy" since there are fewer choices. He added that mediators of satiety, for example, include fiber, volume, and protein, and he hopes to see more research on these because most of the variation in diets in the U.S. is in carbohydrates.

Dr. Campbell asked if messaging should focus on shorter-term or longer-term improvements to health, noting the highest overweight and obesity prevalence and costs are in older adults. Dr. Dietz recommended that we begin early to adopt a culture of health, adding that implementation of the *Dietary Guidelines* is critical for healthy lifestyles. Dr. Campbell inquired if the *Dietary Guidelines* should include disease treatment, and Dr. Dietz responded that the *Dietary Guidelines* is critical to a healthy lifestyle but is adjunct to disease treatment and probably not sufficient to treat disease on its own.

Dr. Millen noted the AHA/ACC report summarizes the evidence on effective weight loss for 6 months or longer using a variety of dietary interventions conducted by qualified professionals and asked Dr. Dietz if he saw that set of recommendations as a breakthrough in terms of management of overweight/obesity. Dr. Dietz responded that it does not specify the exact approaches. Dr. Millen noted that all caloric-reduction diets listed in the report can be successful through a multidisciplinary team approach or implemented by a nutrition professional and that

this perhaps represents a recommended shift to these modes of preventive interventions and treatments.

Dr. Neuhouser asked Dr. Dietz how reimbursement might be changing and what professionals can do. Dr. Dietz noted that the Affordable Care Act ties reimbursement to effectiveness in reducing the cost of care. He mentioned the notion of bundling services to reimburse them simultaneously based on the Affordable Care Act, noting that bundled services are those supported by evidence-based reviews and include intensive interventions for obesity in children and adults.

Mr. Concannon noted a recent visit to a supermarket in the Midwest which employs registered dietitians in the stores. He asked whether it would be beneficial to work with primary care providers to connect registered dietitians to grocery stores and asked Dr. Dietz if he had seen this model elsewhere. Dr. Dietz noted this could be one good place to integrate the *Dietary Guidelines* into community settings.

Effective Strategies and Delivery Approaches to Changing Diet and Activity for Weight Control

Dr. Deborah F. Tate, Gillings School of Global Public Health, University of North Carolina at Chapel Hill, was introduced by Committee member Dr. Pérez-Escamilla. Dr. Tate thanked Dr. Pérez-Escamilla for her introduction and Dr. Dietz for initially talking about the 2013 AHA/ACC/TOS Guideline for Management of Overweight and Obesity in Adults, highlighting a summary statement, “Comprehensive lifestyle interventions consisting of diet, physical activity, and behavior therapy produce 8 kg weight loss in 6 months with frequent in-person treatment.” Dr. Tate focused her presentation on the underling details that support this statement to describe the components of a comprehensive lifestyle intervention capable of achieving changes in behavior. These include 1) use of theoretical models or behavior techniques for weight control interventions, 2) factors impacting the efficacy of face-to-face weight management interventions, and 3) evidence for alternatives to face-to-face delivery modes.

Dr. Tate started with the Social-Ecological Model to talk about theories that are applied to interventions aimed at individuals. In weight management, these interventions include Behavior Modification, Cognitive Behavioral Models, the Transtheoretical Model, and the Self-Determination Theory. Most common are approaches that combine Behavior Modification and Cognitive Behavioral Models. Dr. Tate noted that there is a newer focus on understanding behavior change techniques (i.e., what is actually done to change behavior). Dr. Tate noted that there are few randomized controlled trials focused on isolating techniques and shared that interventions focusing on self-monitoring were most effective.

Dr. Tate talked about factors impacting the efficacy of face-to-face weight management interventions. She reviewed several studies that showed that regular face-to-face feedback from an interventionist was needed for a comprehensive lifestyle modification program to be successful. Face-to-face contact provided in a group or individual format were both successful.

The 2013 AHA/ACC/TOS Guideline for the Management of Overweight and Obesity in Adults indicates that for the best weight loss results (i.e., 8 kg weight loss in 6 months), more intensive contact (more than 14 sessions in 6 months) is needed. Moderate intensive contact of one to two sessions per month could result in weight loss of two to four kilograms in six months. Dr. Tate discussed a stepped-care intervention study where care was adjusted in stages (steps) according to the weight loss results. Standard behavioral intervention (12 sessions in the first 3 months) produced greater weight loss compared to the stepped-care intervention. Dr. Tate summarized that the stepped-care intervention study data highlight that we may be able to provide intensive care with fewer sessions.

Dr. Tate discussed the differences between community (“real world”) and clinical setting interventions. A review of 28 studies that modeled clinical interventions in a community setting showed an average weight loss of about half the amount found in clinical setting interventions with intensive care. Results may be attributable to changes in the application of intervention components in the community. To contrast this review, Dr. Tate discussed a community weight loss trial in underserved rural settings (TOURS) which showed significant weight loss translating a structured clinic-based intervention into a community setting. The success of this study was likely due to extensive contact (50 contacts over 18 months) and the high degree of training and supervision of the interventionists.

Dr. Tate reviewed alternatives to face-to-face delivery modes. Much of her work in this area is based on internet and technology-based interventions. She gave a history of the adoption of broadband and mobile/smart phones, noting that some efficacy might be lost with technologies but greater reach might be gained. These may offset each other in the ability to impact change at a level beneficial to health.

Dr. Tate quoted a definition from Dr. Ritterband that “internet interventions are typically behaviorally or cognitive-behaviorally-based treatments that have been operationalized and transformed for delivery on the internet.” Dr. Tate went on to say that these technologically-based interventions require the same on-going maintenance that human face-to-face interventions involve. A summary of studies showed that automated tailored feedback can be helpful in weight loss, but human intervention is needed for long term effectiveness.

Dr. Tate then concentrated on hybrid or combination approaches. An effectiveness trial using internet as an adjunct to the intervention in combination with in-person support or telephone support showed that combining traditional counseling with telephone support (remote support) resulted in good weight loss over time. Another study looked at face-to-face and e-mail coaching and found that the use of professional and peer coaches resulted in greater weight loss over 6 months compared to a mentor who had successfully lost weight themselves.

Dr. Tate discussed emerging evidence on using mobile technology (e.g., text messages, mobile podcasts, twitter support, and monitoring). She said that internet intervention studies can be adapted to mobile delivery and those studies do not need to be redone. With text messaging, you can get data reports, provide feedback, and automate feedback and reminders. There are few

studies to date on mobile-based approaches, although studies show that weight loss was smaller and more short-term.

Dr. Tate concluded her talk saying that behavioral and cognitive approaches have the most evidence for efficacy in producing clinically-meaningful weight loss and maintenance of lost weight. Combining behaviorally-based intervention components (self-monitoring, feedback, counselor support, etc.) appears to be most effective, and there is less evidence for isolated techniques. There is a potential to decrease face-to-face treatment as long as the intensity is maintained through calls, e-mail, and potentially mailed structured treatment materials. Community- and technology-delivered interventions based on effective clinical models show better results than controls although are less effective than face-to-face behavioral lifestyle interventions carried out by qualified professionals.

Discussion

Dr. Adams-Campbell asked if the increase in technology would widen the gap for different cultures and asked how interventions and theories of planned behavior will help. Dr. Tate responded that efficacy trials with more diverse populations are now being conducted to determine if they achieve equivalent effects or if targeted interventions need to be developed, noting that the disparity gap for access to technology has been closing (e.g., mobile device use has increased in underserved populations). She added that these intervention studies often use self-efficacy theories rather than the theory of planned behavior.

Dr. Abrams asked if the strategies presented can be applied to mothers for monitoring weight changes in small children. Dr. Tate responded that she was unaware if analyses of behavior change techniques have been evaluated with childhood obesity interventions, but noted there may be a review.

Dr. Lichtenstein asked if there is a point where too much feedback to individuals results in ‘tuning’ out. Dr. Tate responded that they tested automatic prompting (not feedback per se) with focus groups for a worksite study; results did not support prompting so it was removed from this study. However, there was low adherence in the study, and she recommended not removing prompting completely so that participants are reminded of their involvement. In another study for weight gain prevention, Dr. Tate found that providing more opportunities to repeat behavior (e.g., reporting weight via text message, web site, etc.) increased adherence. In reference to feedback, Dr. Tate only looked at providing feedback more often than once a week in one (unrandomized) study and suggested common sense prevails on how much useful information to provide.

Dr. Hu asked if you can distinguish short-term weight loss from longer term weight maintenance in terms of effective behavior approaches and if analyses have been done to see which approaches are cost effective. Dr. Tate responded that there are fewer internet intervention studies targeting weight loss maintenance, noting one trial called ‘Stop Regain.’ Participants were recruited after significant weight loss; it was based on self-regulation theories. There is belief that additional theories may be needed for weight maintenance, but are still unknown. Dr.

Tate added that long-term tracking and preventing small regains in weight are important. Intervention groups taught to quickly respond to any regain are more effective at maintaining weight loss. The best results on prevention of weight regain in her studies came from face-to-face interventions; the internet program was only effective in primary prevention of regain. In reference to cost effectiveness, Dr. Tate noted that technology provides opportunities for automated or hybrid approaches, reserving a human for more challenging cases (i.e. providing more care only to those that are struggling) to reduce costs.

Restricting Trans Fat use in Foods: The New York City Experience

Dr. Sonia Angell, Centers for Disease Control and Prevention (CDC), HHS and formerly of the Cardiovascular Disease Prevention and Control Program, New York City Department of Health and Mental Hygiene (NYCDHMH), spoke and reflected on her experiences working with the New York City government, specifically to reduce *trans* fat in the food supply as well as other system level efforts to improve population nutrition. She began by explaining that the public health challenge from an environmental/systems perspective is to remove barriers so that it is easier for individuals to make healthier choices, especially about what they eat. Dr. Angell noted that many of the interventions conducted by the NYCDHMH were focused on changing the context within which people make decisions so that the default decision is a healthy decision; according to Dr. Angell this can have a large impact on public health.

Dr. Angell stated that a 2002 report from the Institute of Medicine (IOM), demonstrating the deleterious effects of trans fat on cardiovascular health was used as the evidence base of their intervention. She explained that the IOM recommended keeping intake as low as possible because there was no way to completely avoid trans fats. Dr. Angell stated that the NYCDHMH felt it could address this issue using a systems approach to public health because at the time 79 percent of artificially produced trans fat in the diet came from partially hydrogenated vegetable oils in processed and restaurant foods.

In 2006, new regulations from the Food and Drug Administration (FDA) were implemented requiring food manufacturers to list the level of *trans* fat in a food on the food label. Prior to this, it was difficult for a consumer to know how much *trans* fat they were consuming. She further stated that consumers eating in NYC restaurants were at a disadvantage because they had no way of knowing if their food contained *trans* fat. Dr. Angell stated that because the NYCDHMH can influence restaurants, it developed a program, the Trans Fat Education Campaign, to motivate voluntary reduction in *trans* fats in restaurant food among restaurants and suppliers. Dr. Angell explained that because the voluntary program had no effect, an amendment to the NYC Health Code to restrict the use of artificial *trans* fat in restaurants was implemented. By the time the regulation was fully implemented, Dr. Angell said that compliance was almost at 100 percent. Within two years of the NYC regulations, other cities, states and municipalities had implemented similar regulations.

Dr. Angell shared another initiative from the NYCDHMH to change the context in which individuals make food choices. This initiative involved aligning the meals and snacks served to NYC residents with specified nutrition standards. A Food Policy Task Force was appointed by

the Mayor to develop criteria. Dr. Angell explained that developing criteria was very complicated because agencies have a multitude of ways that they provide meals. Three sections of standards were developed to address various agency needs.

Dr. Angell explained that the NYCDHMH initiated sodium reduction efforts with a similar approach to what was used to reduce *trans* fat. It built off of the evidence base demonstrating the benefits of reducing salt intake to cardiovascular health. The Nation Salt Reduction Initiative was established to reduce sodium intake within five years, ideally helping consumers achieve recommendations set forth by *Dietary Guidelines for Americans*. Dr. Angell explained that to get gradual reductions, foods were separated by categories and target levels were set working with the food and foodservice industries and public health authorities. Dr. Angell closed her presentation by stating that countries can learn from each other and that scalable, evidence-based models are essential to helping policymakers determine how to implement population-based interventions.

Discussion

Dr. Millen asked for more insight on how the nutrition standards were developed and managed and about the impact of the program. Dr. Angell responded that the nutrition standards were introduced by Executive Order of the Mayor and compliance is assessed annually and posted online. The issues related to initiatives being mandatory versus voluntary needs to be considered within the context of how a program will be managed and how sustainable the program can be. Going through the process, policy officials have to consider where the opportunities are and make decisions from there. Food-based recommendations (e.g., serve three servings of fruit throughout the day) were easier for agencies to implement as opposed to specific levels of trans fat or sodium.

Dr. Nelson asked what it would take to address other dietary concerns like consumption of sugar-sweetened beverages or added sugars. Dr. Angell responded that understanding the baseline levels of intake and dietary sources of added sugars is the first step and looking for opportunities to target changes in intake comes next. Food labeling can help with identifying sources, which can lead to population-based intervention opportunities.

Dr. Hu asked Dr. Angell to compare and contrast interventions related to trans fat and sodium that have been implemented, noting barriers with interventions related to added sugars. Dr. Angell stated that she was not in a good position to answer this question, because she was not with the NYCDPHMH when the interventions related to added sugars were introduced.

Dr. Pérez-Escamilla asked what we can learn from policies that have been implemented in other countries that may have been inspired by work done in the U.S. Dr. Angell stated that interventions that are introduced in certain parts of the world (e.g., taxes on sugar-sweetened beverages) cannot be implemented in certain environments, so it is good to see other countries work through some of the opportunities for intervention (e.g., recent taxes introduced in Mexico on sugar-sweetened beverages and ‘junk food’). She also stated that we have a vested interest in understanding the barriers and opportunities from a systems perspective.

Dr. Brenna asked the speaker to comment on the impact of the introduction of low omega-3 soybean oil and if this played a role in the rapid changes in trans fat content. Dr. Angell stated that many of the oil companies were ready to consider how to implement policies from a production standpoint. This is a place where industry and government can work well together.

***The Contributions of Food Science to Help Americans Achieve the Dietary Guidelines –
Future Opportunities and Challenges***

Mr. John Ruff, Immediate Past President, Institute of Food Technologists (IFT), began by introducing IFT as a non-profit society of food scientists, technologists, and related professionals. He noted the role of food science and technology in transforming raw food materials into a variety of safe, nutritive, palatable, and affordable foods that are available throughout the year. He reviewed many purposes of food science and technology, including preservation, improved food safety, reduction of losses, and improved transportability. Mr. Ruff then reviewed the functions, opportunities, and challenges related to sodium, sugars, and fats and fatty acids in food science and technology.

Mr. Ruff described that sodium is an essential nutrient that is ubiquitous in the food supply, both naturally and added to foods and beverages. The most common form of sodium in food is sodium chloride. Salting was originally a primary method of preserving foods, and advances and new technologies, such as refrigeration and pasteurization, have decreased the need to use salt. Sodium has many functional roles in foods, including food safety, structural integrity, and flavor enhancement. Mr. Ruff offered several sodium reduction strategies, highlighting the use of potassium chloride as a replacement for sodium chloride and reducing portion sizes to reduce calorie consumption. He also noted several challenges to reducing sodium in foods, particularly decreased palatability and microbiological instability. He acknowledged the efforts by food manufacturers to reduce sodium in foods and beverages, including offering low-, no-, and reduced-sodium products as well as gradually removing sodium from foods and beverages without marketing them to consumers as lower-sodium options.

He went on to describe that similar to sodium, sugars occur both intrinsically in foods and beverages and can also be added. There are many types of sugars, and they are similar in terms of composition, sweetness, and other factors. Mr. Ruff described how sugars are used in foods and beverages for many functions beyond sweetness, including improved mouth-feel and moisture management. The primary sugars reduction strategy Mr. Ruff discussed was use of sugars substitutes, including intense sweeteners (e.g., aspartame, saccharin, sucralose). He noted that there have been efforts to reduce sugars in foods and beverages, but a primary issue is that several ingredients may be needed to replace sugars and, in some cases, a complete redesign of a product.

Mr. Ruff described fats and fatty acids as one of the main components of the diet that food scientists, technologists, and the food industry have modified in response to changing dietary guidance, in some cases with unintended consequences. He noted that fats have many functional roles in foods including development of flavor, color, texture, and stability. He acknowledged that there are many innovations underway in the area of fats and fatty acids, including high oleic

acid soybean and canola oils as well as omega-9 oils. However, he noted that these oils are generally less stable due to their unsaturated fatty acid content and do not have the same functionality as solid fats. He said that the food industry continues efforts to modify the fat content of foods, but it is important to consider what is replacing the fat. He also added that the time and cost of fat replacement is frequently the highest of any product reformulation.

In closing, Mr. Ruff encouraged the Committee not to focus on reducing intake of specific nutrients and instead focus on what to consume more. He also said that the nutrient contribution of foods, and not the level of processing, should be considered when selecting foods. He stated that food technologists strive to help Americans achieve the *Dietary Guidelines* recommendations, which, over time, has included reducing calories, sodium, sugars, saturated fats, and *trans* fat from foods and beverages, while also increasing micronutrients of concern.

Discussion

Dr. Lichtenstein asked if potassium chloride has the same functional properties as sodium chloride. Mr. Ruff said that the replacement requires additional ingredients as well, but issues with taste still remain.

Dr. Anderson asked for strategies or “what works” to promote a healthy dietary pattern from a food technologist’s perspective. Mr. Ruff encouraged the Committee to reach out to food scientists on this topic and to provide advice related to the foods and the way people currently eat.

Introduction to Subcommittee Reports

Dr. Barbara Millen, Chair of the DGAC, began by describing that the presentations from each of the five topic area subcommittees would provide the first update of the work to the Committee since the last meeting on January 13-14, 2014. She provided background information common to the process used for each subcommittee. She reiterated the purpose and the charge of the Committee. She noted that Dr. Michael McGinnis encouraged the Committee at the January meeting to strive to provide a strong science base that can inform the *Dietary Guidelines* so that the policy can be the reference point from which Federal food and nutrition policies, programs, and services emanate. She noted the vast reach of the *Dietary Guidelines* through programs and services in HHS and USDA as well as those at the state and local levels. Dr. Millen added that there are opportunities through public and private partnerships to voluntarily implement the *Dietary Guidelines* to positively impact the populations these organizations serve. She noted that even with the very sophisticated health system in the U.S. and the dollars spent on health care, high rates of preventable disease and disability prevail, including many related to diet and physical activity lifestyle choices. Wide health disparities within subpopulations also exist that could be resolved with evidence of “what works” to address the specific needs of these groups.

Dr. Millen reviewed a conceptual model that was originally introduced at the January meeting that is now being reviewed and modified by the Committee to reflect the dynamic factors that

impact lifestyle-related health problems. The model suggests that the complex influences and determinants of diet and physical activity lifestyle choices include the interpersonal and intrapersonal, environmental, sectors, settings, and systems levels of influence. The work of the Committee addresses lifestyle factors that include dimensions of diet such as diversity, quality, security, safety, and sustainability and dimensions of physical activity such as leisure and work activity, screen and other sedentary time, sleep, and exercise. The model links these determinants to health outcomes, including the nutritional status of the population and major causes of morbidity and mortality. The model takes into account the settings in which interventions may take place such as through healthcare, public health settings, and in the community through public-private partnerships. Understanding the complexity of these dynamics and the evidence of “what works” in terms of making positive changes is a key theme of the Committee.

Dr. Millen noted that the core work of the Committee remains making food and nutrient recommendations to the government to promote health in the U.S. However, new themes of this Committee include a greater focus on the evidence of the relationship between dietary patterns and health outcomes; a systems approach that addresses the different spheres of influence on dietary behavior and physical activity and for achieving change at individual and population levels; identifying the evidence for “what works” to improve diet, physical activity, and health; and connections between dietary patterns and sustainability principles to support future food security.

Dr. Millen reviewed the scope of each of the five subcommittees, noting that the presentations to follow will describe the work of each subcommittee as well as work on several topics that cross two or more subcommittees such as sodium, eating out and the food environment, evidence for “what works” to achieve positive outcomes, and physical activity. She described the approach being used to address the cross-cutting topic of physical activity, which will use existing reports to develop key findings and conclusions to a number of questions for Subcommittees 1 through 4.

Dr. Millen described two types of expertise that may be sought by the Committee, invited experts and consultant subcommittee members. Invited experts are individuals invited by a subcommittee, usually on a one-time basis, to provide their expertise to inform the subcommittee’s work; they do not participate in decisions at the subcommittee level. Consultant subcommittee members are individuals sought to participate in subcommittee discussions and decisions on an ongoing basis but are not members of the full Committee. Like Committee members, consultants complete training and have been reviewed and cleared through formal process within the Federal government.

To set the stage for the subcommittee reports, Dr. Millen reviewed the approaches for examining the evidence that are common to all the subcommittees. This includes use of Nutrition Evidence Library (NEL) systematic reviews, original data analyses, existing high-quality reports, and food pattern modeling analyses as well as consideration of public comments. She noted that there are areas where the Committee has solicited specific public comments. She then reviewed the six steps of the NEL process managed by USDA; these steps were presented in detail at the inaugural meeting of the Committee in June 2013. She noted that the NEL process is elaborate,

objective, and systematic. She introduced the types of materials the subcommittees might use in presenting the review of the evidence for the full Committee's consideration. She then turned the floor over to the Subcommittee Chairs, noting they would provide their reports in the order of Subcommittee 1 followed by 5, 4, 3, and then 2.

Subcommittee 1 (SC 1): Food and Nutrient Intakes, and Health: Current Status and Trends

Dr. Marian Neuhouser, SC 1 Chair, identified the members of SC 1 who are Dr. Steven Abrams, Dr. Cheryl Anderson, Dr. Mary Story, and Dr. Alice H. Lichtenstein. She also acknowledged Dr. Barbara Millen as an active member working with SC 1 as well.

She described the scope of the SC 1 work as identifying the current status and trends in: (1) food group, food, and nutrient intake; (2) eating behaviors; (3) dietary patterns; and (4) diet-related chronic diseases, weight, and physical activity. She explained that this is a necessary foundation for the overall Committee report to understand where the population is and to formulate appropriate recommendations. She identified the experts that SC 1 had invited to present on specific topics (listed below). SC 1 did not have any consultant members.

Invited Experts

Dr. Suzanne Murphy, Researcher (Professor) Emeritus, Cancer Research Center of Hawaii, University of Hawaii

Dr. Katherine L. Tucker, Professor, Clinical Laboratory and Nutritional Sciences, Center for Population Health and Disparities, University of Massachusetts, Lowell

Dr. Rafael Pérez-Escamilla, Professor of Epidemiology and Public Health, Director of the Office of Public Health Practice, and Director of the Global Health Concentration, Yale School of Public Health, Yale University

Dr. Patrick Stover, Professor and Director, Division of Nutritional Sciences, College of Human Ecology, Cornell University

Dr. Neuhouser noted that the SC would address the current status of their work on five topics today: Nutrients of Public Health Concern, Eating Behaviors—Status and Trends, Food Category Intakes and Food Sources of Energy, Prevalence of Health Concerns and Trends, and Potential Issues of Overconsumption.

Dr. Neuhouser then identified the specific questions she would address for the topic “Nutrients of Public Health Concern,” which are: What are current consumption patterns of nutrients from foods and beverages in the U.S. population? And, of the nutrients that are over- or under-consumed, which present a substantial public health concern, including consumption over the Tolerable Upper Intake Level (UL)? She described the three-pronged approach SC 1 is using to

answer these questions, first using the National Health and Nutrition Examination Survey (NHANES), our National nutrition monitoring system, and the dietary portion, which is What We Eat in America (WWEIA), to look at nutrient intake distributions from food and beverages by age/sex groups, focusing on data from 2007-2010. She noted that the SC has not yet looked at intakes from supplements but plans to so in the future. The second prong is use of NHANES/CDC biomarker data, where available, which includes blood draws from a subset of the sample and biomarkers such as iron and vitamin D measures. It is being used as an additional piece of information because it may reflect longer term status and be more objective than dietary intake data alone. The third prong is use of functional status indicators, biological measures used by the IOM for setting Dietary Reference Intakes (DRI), and known relationships to chronic disease (e.g., lipid and glucose levels, bone and gastrointestinal health markers, blood pressure, iron status, etc.).

Dr. Neuhouser explained that the SC has identified shortfall and over-consumed nutrients from analysis of usual intake distributions, and nutrients of public health concern from analysis of usual intake distributions, biomarkers, functional indicators, and related health concerns. She noted that because the nutrients of concern have more weight in terms of public health implications, the SC used more than one piece of information to identify them. She showed several charts documenting intakes in relation to the Estimated Average Requirement (EAR) or Adequate Intake (AI) levels. The first was the percent of population with usual intakes of a number of nutrients below the EAR, with those with the highest percent below the EAR at the top, including vitamin D, E, calcium, etc. She noted that for some B vitamins, only a very small fraction have intakes below the EAR. The second chart showed percent of various age/sex groups with usual intakes below the EAR for calcium, as an example of a nutrient with a high percentage below the EAR. The third chart showed the percent of the population ages 2 years and older with usual intakes above the AI for four nutrients. She noted that a nutrient will have an AI when there is not have enough information about the distribution of requirements to set an EAR. The last chart showed that a substantial proportion of all age/sex groups have usual intakes of sodium above the UL.

Dr. Neuhouser noted that from these data, the SC identified the following Nutrients of Public Health Concern for the population ages 2 years and older: vitamin D and calcium, for which the indicator is bone health; potassium and sodium (sodium is of concern for high intakes), for which the indicator is blood pressure; and dietary fiber, for which the indicator is gastrointestinal health. For some age/sex groups, iron is also a nutrient of concern, with the indicator being iron deficiency. She turned the presentation over to SC 1 member, Dr. Story.

Dr. Siega-Riz asked about the prevalence of iron deficiency by subgroups, especially for pregnancy, noting that mild to moderate iron deficiency in pregnancy has not benefited from supplementation. Dr. Neuhouser deferred answering questions until the end of SC1's presentation.

Dr. Story presented findings from the SC on Eating Behaviors, including the current status for the following eating behaviors: number of daily eating occasions, frequency of meal skipping, diet quality by meal/snack, and eating behaviors-status and trends. In the future SC 1 will be

looking at trends and subpopulations. The approach used is to analyze data, summarizing existing WWEIA data tables from NHANES 2009-10 for current status and from NHANES 2003-04, 2005-06, and 2007-08 for trends.

Dr. Story first presented the number of meals reported per day by age/gender groups from 2009-10 data, reminding the Committee that data are self-reported. She noted the U-shaped pattern for those consuming three meals a day for both males and females with dips for young adults and higher levels for younger and older persons. Three meals a day is the norm, with 63 percent reporting consuming three meals a day and the highest percentage for young children. Consuming one meal a day is most likely to occur in young adult males and females, but most of these individuals reported consuming two to three snacks a day in addition. She then presented information about the percent of individuals skipping specific meals, by age/gender groups. Only 5 to 10 percent of any age group reported skipping dinner, but 20-25 percent reported skipping lunch and for young adults 20 to more than 25 percent reported skipping breakfast.

Dr. Story then presented a group of slides that show diet quality stratified by meal, by comparing the percent of total intake of selected nutrients with the percent of total energy intake from that meal. Nutrients shown included potential nutrients of concern and protein. Breakfast represented about 15-20 percent of energy intake, but a higher percent of total intake for almost all selected nutrients, and as such, would be considered to have good overall dietary quality. In contrast, lunch is neutral in dietary quality, with nutrients and energy at roughly similar percentages of the total. Dinner is neutral to lower quality compared to other meals and is also higher in sodium and saturated fat, which were not shown. Snacks were lower in positive nutrients in comparison to energy, but provided a substantial amount of energy. For young children 28 percent and across all ages about 25 percent of energy came from snacks, but snacks were lower in dietary quality compared to other eating occasions.

Dr. Story noted that so far, the key findings on eating behaviors are that eating three meals a day is the norm, but teens/young adults are most likely to skip one or more meals, usually breakfast or lunch. In addition, breakfast is relatively nutrient-dense compared to lunch or dinner. Snacks provide the lowest percent of some key nutrients compared to the percent of energy. Dr. Story then turned the floor over to SC 1 member, Dr. Anderson.

Dr. Anderson presented on Food Category Intakes to answer the questions: What are the top foods contributing to energy intake in the U.S. population? And, what are current consumption patterns by food categories (foods as consumed) in the U.S. population? The approach, which will be described in the report, was to examine the NHANES 2009-10 WWEIA Food Categories which were condensed into nine major and 32 subcategories. The percent of total energy and several nutrients from each was examined. In the future the SC will be looking at similar analyses for subpopulation groups and more outcome nutrients.

Dr. Anderson showed the top energy sources by subcategory. Fifteen subcategories were listed that represented over 75 percent of total energy intake. The top three categories were burgers and sandwiches, desserts and sweet snacks, and sugar-sweetened beverages, which together made up

about 29 percent of total energy intake. Of the nine major categories, the greatest contribution of energy is from mixed dishes, and within that major category, from burgers and sandwiches. She then showed the food sources of sodium by the nine major categories and noted that sodium is ubiquitous in the food supply, as large contributions come from mixed dishes and the subcategory of burgers and sandwiches within mixed dishes. The largest contributors to added sugars intake were 47 percent from beverages and 33 percent from snacks and sweets. Within beverages soft drinks, fruit drinks, and sport and energy drinks, which make up the subcategory of sugar-sweetened beverages, account for 39 percent of added sugars intake. Lastly, she showed the contributions to saturated fat intake and again mixed dishes were the largest contributor, with burgers and sandwiches as key contributors.

Dr. Anderson summarized the key findings that foods with the highest contribution to energy intake are burgers and sandwiches, desserts and sweet snacks, and sugar-sweetened beverages, and of the nine major categories, mixed dishes contributed the most energy, sodium, and saturated fat and beverages contribute the most added sugars. She emphasized that these are preliminary analyses and are subject to change.

Dr. Anderson then presented findings on another topic, the prevalence and trends in diet-related health concerns in the U.S. population. She focused on two questions: What is the current prevalence of overweight/obesity in the U.S. population? And, what are the trends in prevalence of overweight/obesity in the U.S. population? In the future the SC will address numerous other health concerns. The approach is to summarize NHANES data tables from the CDC website and published peer-reviewed articles by CDC authors, using 2011-12 data for current status and various survey years for trends, including 1988-94 to 2011-12. She presented charts showing the status and trends in overweight and three grades of obesity for adults by gender from 1988-94 to 2011-12. She presented charts showing trends in overweight and obesity among boys and girls ages 2 to 19 from 1999-2000 to 2011-12 and the trends in obesity by age groups among children from 1988-94 to 2011-12. She also presented a summary of trends in abdominal obesity among adults by age/gender category. She summarized the key findings to date. In adults the prevalence of overweight (but not obesity) remained stable from 1988-94 to 2011-12 at very high levels, and the prevalence of abdominal obesity differs by age/sex with the highest prevalence in females 60 years of age and older. In children the prevalence of overweight and obesity was stable from 1999-00 to 2011-12, but there were different patterns across the age categories.

Dr. Abrams then presented one question from the topic area of potential issues of overconsumption: What are current consumption patterns of caffeine from foods and beverages in the U.S. population, including during pregnancy? The approach assessed usual intake distributions for caffeine from NHANES data from 2007-2010 and caffeine sources from NHANES data from 2009-2010. He presented mean and percentiles of usual caffeine intake by age/gender groups for adults and for children and adolescents. For some adults over 30 years of age, 90th percentile intakes were about 400 milligrams per day, which is considered a moderate level of caffeine intake. Intakes for children were much lower than for adults, and intakes markedly increased in adolescence relative to early childhood due to coffee and soda consumption. He also presented mean and usual intake distributions for pregnant women in comparison to non-pregnant women ages 19-50 years. Intakes for pregnant women are

considerably lower relative to non-pregnant women and fall within what some suggest as a safe limit of 100 to 150 milligrams of caffeine. A chart of food sources of caffeine showed that coffee, tea, and soft drinks were the primary sources for the overall population. He identified the key findings to date on this topic. Increased caffeine intake becomes common beginning in adolescence and is associated with consumption of coffee, tea, and soda. Some adults over age 30 years have intakes greater than 400 milligrams per day. He also noted that the data summarized do not reflect caffeine-containing supplements and may not reflect any recent increase in energy drink consumption.

Dr. Neuhouser presented the next steps for SC 1. Questions that will be addressed include 1) nutrient intakes from food plus supplements by race/ethnicity, acculturation, and pregnancy and for additional nutrients (e.g., saturated fat and overall energy); 2) food group intake patterns and trends; 3) food sources by age/gender groups and for nutrients of concern; 4) diet quality by food source and location; 5) patterns of beverage intake; 6) adherence and trends to dietary patterns; 7) prevalence and trends of chronic disease indicators; 8) overconsumption of micronutrients from foods and supplements (e.g., calcium, iron, and folate); 9) adequacy and impact of potential changes in recommendations of the USDA Food Patterns; and 10) current levels of physical activity in youth, adults, and older adults.

Discussion

Dr. Neuhouser, in response to Dr. Siega-Riz's earlier question, presented prevalence data for various measures of iron deficiency, and added that right now, the SC is just considering the nutrients of concern as key findings, haven't formed conclusions or examined intakes during pregnancy yet, and would welcome additional input.

Dr. Hu noted that iron overload is more prevalent in postmenopausal women and older men, and asked how to balance that with deficiency. Dr. Neuhouser responded that this is important, and there is no group whose intakes approach the UL from food alone, but that the SC will also be looking at food plus supplement intakes.

Dr. Adams-Campbell asked about the role of lactose intolerance in relation to vitamin D and calcium intakes below the EAR and how this would influence recommendations. Dr. Abrams replied the primary source currently is dairy products, but that other good sources exist. He noted that it is important to focus on foods and evaluate how foods in the U.S. can meet needs.

Dr. Nelson asked if the SC would be presenting the total amounts of added sugars consumed as well as the sources. Dr. Anderson said they would.

Dr. Siega-Riz asked about the congruency between biomarkers and intakes for vitamin D in determining vitamin D deficiency. Dr. Abrams responded that most vitamin D comes from sunlight, so there is not as much deficiency as intake levels would suggest, noting this needs to be integrated into making recommendations.

Dr. Hu noted that a new IOM committee was revising calcium and D recommendations. Dr. Abrams responded that the IOM report came out in 2010, and the SC will continue to use that report and determine how it might affect policy.

Dr. Lichtenstein asked if potential adverse effects of calcium supplements were considered. Dr. Neuhausser noted that this was a good point to consider.

Subcommittee 5 (SC 5): Food Sustainability and Safety

Dr. Miriam Nelson, SC 5 Chair, began by acknowledging the subcommittee members Dr. Steven Abrams, Dr. Thomas Brenna, Dr. Frank Hu, and Dr. Barbara Millen. She also acknowledged Dr. Alice H. Lichtenstein as an active member working with SC 5 as well.

Dr. Nelson then reviewed the scope for SC 5. For the area of Food Safety, SC 5 will systematically review the evidence for targeted food safety concerns at both the individual and population levels. In the area of Food Sustainability, SC 5 is reviewing the available evidence to understand the links between food intake, sustainability, and long-term food security.

Dr. Nelson reported that SC 5 had invited several experts to its meetings where they provided information requested by SC 5 to inform its work. “Invited experts” generally provide expertise on a one-time basis; they are not SC 5 members and were not involved in decision-making. In addition to these “invited experts,” two “consultants” were identified as well. In contrast, “consultants” are added as SC 5 members and participate in SC 5 discussions and decisions on an ongoing basis, but are not members of the full Committee. These individuals are listed below.

Invited Experts

Dr. Robert Brackett, Vice President and Director, Institute for Food Safety and Health, Bedford Park, IL; Former FDA/CFRAN Director; Topic: Food safety in the context of nutrition

Dr. Kate Clancy, Food systems consultant, John Hopkins University School of Public Health; Topic: *Dietary Guidelines* and sustainability

Dr. Kathleen Merrigan, Former USDA Deputy Secretary; Topic: Food systems and sustainability, food sustainability

Dr. Andrew Zajac, Division of Petition Review, Office of Food Additive Safety, FDA; Topic: Food additives

Dr. Antonia Mattia, Director, Division of Biotechnology & GRAS Notice Review, Office of Food Additive Safety, FDA; Topic: Caffeine

Dr. Amelia Arria, Associate Professor, Department of Behavioral and Community Health and Director, Center on Young Adult Health and Development from the University of Maryland School of Public Health; Topic: Caffeine

Consultant SC 5 Members

Dr. Michael Hamm, C.S. Mott Professor of Sustainable Agriculture, Department of Resource Development, College of Agriculture and Natural Resources, Michigan State University

Dr. Timothy Griffin, Director for the Agriculture and Environment Program and Associate Professor at the Friedman School of Nutrition Science and Policy at Tufts University

Dr. Nelson reported that for the topic of prevention of foodborne illnesses, SC 5 has been reviewing the report from the 2010 Dietary Guidelines Advisory Committee (Part D. Section 8) and will bring forward findings related to individual food safety behaviors. Topics include hand sanitation, cleaning refrigerators, separating food to minimize cross contamination, cooking and chilling food appropriately, avoiding risky foods, and overall individual food safety behavior.

Dr. Hu presented the progress on caffeine and coffee consumption. The effects of coffee/caffeine consumption have not been evaluated by any prior Dietary Guidelines Advisory Committee. He began by providing background on coffee and caffeine intake, noting that coffee is one of the most widely consumed beverages among Americans and represents a major source of caffeine intake.

Dr. Hu reported that the subcommittee reviewed systematic reviews and meta-analyses published since 1998 on coffee/caffeine and various health outcomes. There have been many meta-analyses with a wide range of health outcomes that have been published; these outcomes include total mortality, cardiovascular disease (CVD) (including stroke, coronary heart disease, atrial fibrillation, blood pressure, and blood lipids), type 2 diabetes (T2D), cancer, neurodegenerative disease (including Parkinson's disease), and pregnancy outcomes.

Dr. Hu presented the key findings for the aforementioned health outcomes. For total mortality, CVD, and T2D, moderate coffee consumption (1-6 cups/day) was inversely associated with total mortality, especially CVD mortality. Moderate coffee consumption was inversely associated with CVD risk with the lowest risk at three to five cups per day. There was no evidence of an association between long-term coffee consumption and increased blood pressure. Unfiltered, but not filtered, coffee increased blood lipids. Coffee consumption was inversely associated with T2D risk in a dose-response manner (7% lower for 1 cup/day). Regular coffee and de-caffeinated coffee conferred similar benefits regarding T2D risk. However, in subjects with T2D, ingestion of caffeine between 200 to 500 milligrams per day was associated with acutely higher blood sugar levels in Randomized Control Trials (RCTs). For cancer risk, coffee consumption was associated with a significantly lower risk of liver and endometrial cancer.

Dr. Hu then presented a draft conclusion statement for caffeine and chronic disease. A preponderance of evidence showed that moderate coffee consumption was associated with decreased risk of CVD and T2D in healthy adults. There was no evidence that higher coffee consumption was associated with increased risk of CVD. There was consistent evidence that regular consumption of coffee was associated with lower risk of liver cancer and endometrial cancer. Slightly inverse or null associations were observed for other cancer sites.

Dr. Hu reviewed key findings and then presented a draft conclusion statement for caffeine and neurodegenerative disease. Limited evidence indicated that caffeine consumption was associated with a modestly lower risk of cognitive decline or impairment and lower risk of Alzheimer's disease. There was consistent evidence of a protective association between caffeine intake and Parkinson's disease.

The key findings for pregnancy outcomes showed no association between caffeine intake during pregnancy and risk of pre-term birth in cohort or case-control studies, although there was a suggestion of slightly elevated risk in the second trimester in cohort studies. Consumption of caffeine from various sources greater than 150 mg/day was associated with increased risk of spontaneous miscarriage and low birth weight, but control for confounders such as maternal age, smoking, or alcohol was not possible. Dr. Hu presented a draft conclusion statement for caffeine and pregnancy outcomes. There was limited, inconsistent evidence on the relationship between caffeine consumption and pregnancy outcomes.

Draft health implications for caffeine intake were presented. Consumption of coffee/caffeine within the usual range is not associated with increased chronic disease in healthy adults, but instead may confer benefits for multiple health outcomes, especially CVD, T2D, some cancers, and Parkinson's disease. Moderate coffee/caffeine consumption can be incorporated into a healthy lifestyle when engaging in other healthy behaviors such as refraining from smoking, consuming a nutritionally balanced diet, and being physically active. But caution is needed for vulnerable populations such as women who are pregnant and adolescents.

Dr. Hu presented draft research recommendations. More research is recommended on coffee/caffeine and cancer at different sites; cognition, neurodegenerative diseases, and depression; for mechanisms of protective effects on CVD and T2D; vulnerable populations such as women who are pregnant (related to premature birth, low birth weight, and spontaneous abortion); individuals with existing chronic disease; and for sleep patterns, quality of life, and dependency/addiction.

Dr. Pérez-Escamilla asked about the types of study designs for caffeine. Dr. Hu indicated that the vast majority of studies related to heart outcomes, T2D, cancer, and neurodegenerative diseases were perspective cohort studies. For intermediate outcomes such as blood glucose, blood lipids, and blood pressure, short term randomized control trials were available.

Dr. Nelson then moved to the question on aspartame, "What is the relationship between aspartame consumption and health?" The European Food Safety Authority (EFSA) expert report by the EFSA Panel on Food Additives and Nutrient Sources added to Food published a report

“Scientific Opinion on the Re-evaluation of Aspartame as a Food Additive (2013).” This expert report found that, overall, intakes of aspartame are not associated with an increased risk of adverse outcomes in populations who do not have phenylketonuria (PKU). There is some concern requiring further investigation that exists for some cancers, especially hematopoietic ones, but the data do not clearly identify a relationship. The report also indicated further evaluation and research were required to evaluate the relationship between intakes amongst higher exposure groups during pregnancy and risk of preterm delivery. In addition, the EFSA report states that overall exposures up to 40 milligrams per kilogram per day do not pose safety concerns based on a dose-response model of evidence-based safe blood levels. Intakes exceeding this amount are uncommon in the U.S. population, and it is important to emphasize that these findings do not apply to individuals with PKU. SC 5 has just begun work on the topic of high dose caffeine intake that will likely focus on vulnerable populations such as children, adolescents, young adults, and possibly older adults.

Dr. Nelson then moved on to the topic in SC 5 that addresses sustainability and long-term food security. She recognized that sustainability is a newer outcome about which the Committee is evaluating the evidence. She noted the importance of connecting food production (and acquisition) more closely with health outcomes so that consumer food choices can be aligned with eating well today and for generations to come. Dr. Nelson presented a three pronged diagram that demonstrated where 1) food patterns and intake, 2) food security, and 3) food sustainability intersect to contribute to health and wellbeing. Food security was defined using the Food and Agriculture Organization definition, “when all people at all times have access to sufficient, safe, nutritious food to maintain a healthy and active life” which relates to a sustainable food system. Both SC 4 and SC 5 are looking at issues from a systems-wide approach. Other developed countries are doing interesting work in this area and SC 5 is reviewing how other countries are moving forward on this topic. Dr. Nelson thanked everyone from both the public and private sectors for their comment submissions to DietaryGuidelines.gov regarding sustainability.

The current SC 5 sustainability question is “What is the relationship between population-level dietary patterns and long-term food sustainability and related food security?” It is anticipated that this question will be answered by a NEL systematic review. The analytical framework was presented. It includes the intervention/exposure of dietary patterns assessed with the use of modeling to determine food components, and life cycle assessment (e.g., production, transport, retail, waste, etc.) to determine the environmental impact of the inventory of food components. The health outcomes associated with the dietary patterns were also a contributing component.

Dr. Nelson presented a description of the evidence for 15 studies that met the inclusion criteria. She reported there are no draft conclusions for this topic yet, but from a preliminary review of the evidence the findings show consistency of themes. There seems to be a variety of dietary patterns related to food security. These are not strictly vegetarian dietary patterns but are more plant-based. They also seem to be in alignment with the 2010 *Dietary Guidelines* recommendations.

The next steps for this topic included developing a conceptual model, potentially addressing fish sustainability in relation to dietary guidance, and identifying research gaps.

Discussion

Dr. Siega-Riz asked Dr. Hu to clarify the draft conclusions on pregnancy outcomes related to preterm birth and miscarriages. She did not expect that the effects of caffeine would be the same across all of the different health outcomes. Dr. Hu mentioned that the amount of literature on pregnancy-related outcomes is much less than the other health outcomes. Dr. Siega-Riz suggested further description of this evidence. Dr. Nelson said SC 5 will work with Dr. Siega-Riz further on refining the conclusion statements.

Dr. Pérez-Escamilla mentioned that many of the sustainability studies use assumptions in modeling and asked how SC 5 is planning to assess the quality of these studies. Dr. Nelson answered that with the help of two consultants, SC 5 will be analyzing the quality of this evidence in more detail as part of their next steps.

Dr. Neuhouser asked if SC 5 has reviewed any evidence on farmers markets and carbon footprint related to sustainability. Dr. Nelson said access to farmers markets may be something that SC 4 evaluates; SC 5 will be looking beyond farmers markets, focusing on the food systems level and considering the footprint from farm to fork.

Dr. Campbell asked how SC 5 is approaching the differences between caffeine and coffee. Dr. Hu answered that two-thirds of caffeine intake comes from coffee, and it is really difficult to separate the effects of coffee and caffeine in large epidemiological studies. However, for some disease outcomes coffee as a beverage is more relevant, but in others caffeine may be the active substance.

Dr. Lichtenstein commented that when SC 5 reviews the evidence on sustainability to keep availability, affordability, and accessibility in mind, especially as it may impact the broader population. Dr. Nelson agreed.

Subcommittee 4 (SC 4): Food and Physical Activity Environments

Dr. Mary Story, SC 4 Chair, began the presentation by recognizing the other subcommittee members, Dr. Lucile Adams-Campbell, Dr. Wayne Campbell, Dr. Miriam Nelson, and Dr. Barbara Millen. She provided an overview of the work that SC 4 has conducted between the January and March Committee meetings. She noted that SC 4 has not had any invited experts or consultant subcommittee members. Dr. Story noted SC 4 is interested in community and public health approaches that can improve diet and reduce rates of obesity. SC 4 has three main objectives: 1) understand and assess the role of the food environment in promoting or hindering healthy eating in various settings and subpopulations; 2) identify the most effective evidenced-based diet-related programs, practices, and environmental and policy approaches to improve health and reduce disparities; and 3) review the evidence on the effects of food and physical

environments on dietary intake, behaviors, and health outcomes (e.g., weight status). Dr. Story noted that questions and approaches for four key topic areas would be presented: 1) food access, 2) early childcare and education settings, 3) school settings, and 4) physical activity.

For the food access topic area, Dr. Story stated that the questions will be answered using a NEL systematic review. SC 4 is using criteria established by the Economic Research Service of USDA to define food accessibility. Current questions of interest are focused on the relationship between neighborhood/community food access in food retail settings and the dietary intake, quality, and weight status of individuals. Using the analytical framework and inclusion and exclusion criteria developed by the SC 4, 40 studies were selected for inclusion.

For early child care settings, three questions have been developed that will be answered using existing systematic reviews. These questions include: 1) “What early childhood education programs, policies, and practices have had a positive effect on dietary intake?”; 2) “What is the effect of interventions on dietary intake, quality, and behavior?”; and 3) “What is the effect of interventions on weight/growth and development outcomes?”

For schools settings, three questions were developed, which will be answered using either the NEL systematic review process or existing systematic review(s). Current questions include: 1) “What school-based approaches have had a positive impact on diet?”; 2) “What is the effect of interventions on dietary intake, quality, and behavior?”; and 3) “What is the effect of interventions on weight and growth and development outcomes?”

Dr. Story concluded her presentation by noting that SC 4 will also address physical activity and other topic areas of interest that include worksite settings, food marketing, afterschool settings, nutrition assistance programs, post-secondary education settings, and multi-component community-based interventions.

Discussion

Dr. Anderson asked how the SC 4 plans to evaluate research related to food swamps and food deserts. Dr. Story responded that they will be looking at individual studies to determine appropriate measures or definitions.

Dr. Siega-Riz asked how the SC 4 will be addressing subgroups within populations and how that might relate to various outcomes measures across the lifespan. Dr. Story responded that work to abstract key findings from each study is now underway, and many of these data points are being extracted for the subcommittee to consider.

Dr. Millen asked if the literature in these topic areas address multi-sectoral approaches that have been implemented to enact change within an environment. Dr. Story responded that they will keep this in mind as they review the literature to see what might exist.

Dr. Anderson asked if SC 4 will be looking across various environments to assess health outcomes. Dr. Story responded that she is not sure if the field has progressed that far yet and stated that developing research recommendations will be an important part of the SC 4's work.

Subcommittee 3 (SC 3): Diet and Physical Activity Behavior Change

Dr. Rafael Pérez-Escamilla, SC 3 Chair, began by acknowledging and thanking the other members of SC 3, Dr. Lucile Adams-Campbell, Dr. Wayne Campbell, Dr. Steven Clinton, Dr. Anna Maria Siega-Riz, and Dr. Barbara Millen.

Dr. Pérez-Escamilla then discussed the scope of SC 3. This subcommittee is focused on facilitators/barriers of dietary and physical activity behaviors and interventions to help people adhere to dietary and physical activity recommendations. SC 3 has decided to specifically focus on self-monitoring as a technique to determine how it can influence outcomes.

Next, Dr. Pérez-Escamilla highlighted the key topic areas for SC 3 and noted that preliminary conclusions for sedentary behavior, including screen time, would be presented today. Work is currently underway for other topics including acculturation, mobile health, sedentary behavior (behavioral interventions), eating out, household food insecurity, family shared meals, sleep, and the use of food/menu labels. He noted that SC 3 had not had any invited experts, but had a new consultant subcommittee member, Dr. Michael Perri (listed below).

Consultant SC Member

Dr. Michael Perri, Dean, College of Public Health and Health Professions and The Robert G. Frank Endowed Professor of Clinical and Health Psychology, University of Florida

Dr. Campbell presented next on the topic of sedentary behavior. The question for this topic is “What is the relationship between sedentary behaviors (including recreational, occupational, and screen time) and dietary intake and body weight in adults?” and noted that a NEL systematic review was done for this question. He reviewed the working definition of sedentary behavior, the analytical framework, inclusion and exclusion criteria for the literature search, the literature search results, and a description of the evidence. He noted that SC 3 looked at sedentary behavior in adults and also at longitudinal studies on childhood screen time and body weight in adults. Dr. Campbell presented draft key findings and draft conclusion statements that 1) consistent evidence exists associating increased TV viewing with increased body weight/BMI/body fat as children transition from adolescence to adulthood; 2) no prospective association exists between sedentary behavior in adulthood and body weight or body weight changes over a time period of approximately four to seven years; and 3) insufficient evidence exists to address the association between sedentary behavior and dietary intake in adults.

Dr. Pérez-Escamilla then shared updates on the next topics SC 3 will be addressing. He noted that acculturation will be covered through a NEL systematic review and that there appears to be enough evidence to address Asian and Hispanic populations. The involvement of the consultant,

Dr. Perri, has been helpful to refine the mobile health and behavioral intervention topics, which will focus on self-monitoring techniques and methodologies. The topic that addresses eating out is under development and will be an update to the 2010 Committee's questions. Dr. Pérez-Escamilla commented that the other topics are in development and that SC 3 would appreciate any input from the Committee on what aspects of food/menu label use should be of focus.

Discussion

Dr. Hu asked if Dr. Campbell could clarify and provide some additional details about the study design for the topic of sedentary behavior. Dr. Campbell responded by describing the types of study designs, 20 were prospective cohorts, one was a retrospective cohort, 15 examined sedentary behavior in adults, and six longitudinal studies examined childhood screen time and weight in adulthood.

Dr. Hu then asked if chronic disease outcomes were examined. Dr. Wayne Campbell responded that chronic disease outcomes were a lower tier priority and would have required a separate review.

Dr. Hu asked about the time frame for the literature search. Dr. Rafael Pérez-Escamilla responded that the search was from 2004-2014. This builds on a similar sedentary behavior question answered by the 2010 Committee based on a review article from 2004.

Dr. Lichtenstein inquired whether previous literature focused on screen time. Dr. Campbell responded that with children, the literature was primarily focused on TV screen time.

Dr. Anderson asked where the studies were conducted and if they were equivalent to the U.S. Dr. Campbell responded that there were five studies in the U.S., six from Australia, six from the U.K., two from New Zealand, one from Canada, and one from Spain and decisions for inclusion were based on the NEL criteria for highly developed countries. Dr. Adams-Campbell added that research in some countries may be ahead of that in the U.S., so it was important to include them.

Dr. Story asked if the relationship between screen time and youth and dietary intake was addressed. Dr. Campbell responded that data were presented today only for adults and that youth would be addressed next. For adults, there were only two studies, which included dietary outcomes; there was not enough information to draw specific conclusions.

Dr. Siega-Riz commented that it would be helpful for the Committee to understand how the food label is changing.

Dr. Hu asked whether it would be helpful to include cross-sectional studies since diet is a mediator. Dr. Pérez-Escamilla noted that three studies addressed reverse causality, but perhaps there may be a cyclical relationship (i.e., screen time may affect weight at the same time that weight status may affect screen time).

Dr. Story inquired if SC 3 would be identifying “what works” for interventions. Dr. Campbell responded there were limited RCTs in the literature for adults, but SC 3 is hoping to address interventions with screen time in youth as a next step.

Subcommittee 2 (SC 2): Dietary Patterns, Foods and Nutrients, and Health Outcomes

Dr. Anna Maria Siega-Riz, SC 2 Chair, began by acknowledging the other SC 2 members, Dr. Cheryl Anderson, Dr. Tom Brenna, Dr. Steven Clinton, Dr. Frank Hu, Dr. Marian Neuhouser, Dr. Rafael Pérez-Escamilla, and Dr. Alice H. Lichtenstein. She also acknowledged Dr. Barbara Millen as an active member working with SC 1 as well. She stated that the focus SC 2 is to consider foods and nutrients in the context of dietary patterns; however, the subcommittee will answer targeted questions on foods or nutrients, as needed. SC 2 is considering the relationship between dietary patterns and several health outcomes, including CVD, T2D, body weight and obesity, cancer, neurological and psychological illnesses, pregnancy outcomes, and bone health. Specific questions on sodium, alcohol, and cholesterol will also be answered by SC 2. Dr. Siega-Riz said that SC 2 had spoken to invited experts (listed below) on the topics of the joint guidelines from the AHA/ACC/TOS, bone health, and alcohol. She then noted that the members in SC 2 that are leading each topic currently under review would provide an update on the subcommittee’s work.

Invited Experts

Dr. Robert H. Eckel, Charles A. Boettcher Endowed Chair in Atherosclerosis; Professor of Medicine in the Division of Endocrinology, Metabolism and Diabetes, and Cardiology; Professor of Physiology and Biophysics; and Program Director, Adult General Clinical research Center; University of Colorado

Dr. Donna H. Ryan, Associate Executive Director of Clinical Research, Pennington Biomedical Research Center

Dr. Connie M. Weaver, Distinguished Professor and Department Head, Department of Nutrition Science, College of Health and Human Sciences, Purdue University

Dr. Steven Abrams, Professor of Pediatrics, Baylor College of Medicine

Dr. Lorraine Gunzerath, Senior Advisor to the Director, National Institute on Alcohol Abuse and Alcoholism, National Institutes of Health

Dr. Hu discussed the series of questions that are under review examining the relationship between dietary patterns and CVD, body weight and obesity, and T2D. These questions will be answered using existing reports. In 2014 the Nutrition Evidence Library published a systematic review project examining the relationship between dietary patterns and these health outcomes that will be used as a source of evidence by SC 2. Additionally, for the review on CVD, SC 2 will examine the 2013 AHA/ACC Guideline on Lifestyle Management to Reduce Cardiovascular

Risk, and for the review on body weight and obesity, SC 2 will consider the 2013 AHA/ACC/TOS Guideline for the Management of Overweight and Obesity in Adults. Dr. Hu reviewed the conclusions and recommendations from these reports and noted that the next step for the subcommittee was to conduct searches to identify systematic reviews and meta-analyses published since the searches were completed for these existing reports. Dr. Hu closed by saying that SC 2 is still reviewing the evidence for these questions.

Discussion

Dr. Neuhouser acknowledged the use of the word “and,” instead of “or,” in the conclusions from the existing reports that Dr. Hu reviewed. She said that one of the advantages of looking at dietary patterns is that it considers the diet as a whole, which may be greater than the sum of its parts. She encouraged the subcommittee to be cautious and thoughtful in how it proceeds in discussing the food drivers within the dietary patterns. Dr. Hu agreed and noted that there is consistency across the reports in the foods and nutrients identified in describing a “healthy” dietary pattern.

Dr. Abrams asked if literature in children was being considered. Dr. Hu responded that not many studies with children had been identified, mainly because of the particular outcomes being considered. Additionally, Dr. Lichtenstein noted that the AHA/ACC/TOS guidelines were for adults 18 years and older.

Subcommittee 2, Continued

Dr. Neuhouser discussed the questions under review examining the relationship between dietary patterns and risk of cancer. (Dr. Neuhouser presented on behalf of Dr. Clinton who had departed.) Dr. Neuhouser began by acknowledging that cancer represents over 100 diseases, but the SC 2’s strategy is to focus on the four types of cancer that account for over 50 percent of all non-melanoma type skin cancer in Americans: breast, prostate, lung, and colorectal cancer. The relationship between dietary patterns and cancer will be examined using NEL systematic reviews. Dr. Neuhouser reviewed the analytical framework, search strategy, and inclusion/exclusion criteria for the reviews. After the literature search and consideration of criteria, the final reviews for the breast, colorectal, lung, and prostate cancer include 25, 22, 4, and 7 studies, respectively. Dr. Neuhouser noted that the evidence for prostate and lung cancer was limited, but that the evidence for all four of the cancer outcomes is still under review by the subcommittee.

Discussion

Dr. Adams-Campbell asked if menopausal status was being considered related to breast cancer and if race/ethnicity was a factor under consideration for the question on prostate cancer. Dr. Neuhouser responded that these factors were being considered in the reviews and acknowledged that there are limited analyses available by race/ethnicity.

Subcommittee 2, Continued

Dr. Anderson reviewed the work of the Committee related to sodium. She stated that the Committee has formed a Sodium Working Group with representatives from Subcommittees 1, 2, 3, and 4 to examine this cross-cutting topic. Related to sodium and health, the SC 2 is considering the relationship between dietary sodium intake and blood pressure and other cardiovascular disease outcomes. These questions will be answered using existing reports. She noted that the Sodium Working Group would be relying on four major reports to inform their work: 2013 AHA/ACC Guideline on Lifestyle Management to Reduce Cardiovascular Risk, IOM Report on Sodium Intake in Populations: Assessment of Evidence, IOM Report on Population Strategies to Reduce Sodium Intake, and the DRIs for water, potassium, sodium, chloride, and sulfate. Additionally, the subcommittee will scan literature from January 2013 to present to ensure recent literature has been captured. Dr. Anderson reviewed the recommendations from the AHA/ACC report and closed by acknowledging that the Sodium Working Group wants to consider sodium in the context of a healthy dietary pattern and identify achievable, affordable, and practical strategies consistent with an ecological model to reduce sodium intake.

Dr. Siega-Riz closed the SC 2 presentation by acknowledging the next questions under review. These include NEL systematic reviews for dietary patterns and neurological and psychological illnesses as well as bone health and dietary patterns during preconception and birth defects. Additionally, the subcommittee will answer targeted questions on cholesterol and alcohol with existing reports, when possible.

Discussion

Dr. Lichtenstein commented that cholesterol and alcohol will need to be considered cautiously because it is important to consider how changes in these components of the diet impact other aspects of the diet. Additionally, alcohol consumption may be associated with other lifestyle behaviors. Dr. Neuhouser agreed.

DGAC Next Steps and Meeting Wrap Up

Dr. Millen thanked the Chairs of the subcommittees, lead members of working groups, and the support staff for their work. She highlighted the systematic, objective, and thorough approach the Committee is using for its review of the scientific evidence, noting that it is an extraordinarily intricate process. She added that the scope of the evidence under review highlights the commitment of the Committee to address the complex set of determinants and influences on diet and physical activity behaviors and the relationships between those behaviors and health outcomes in a robust way. She thanked the consultants for their willingness to contribute, thanked invited experts for their insights requested from the subcommittees, and thanked the public for their comments. The Committee's goal is to submit its report by the end of calendar year 2014. After concluding her remarks, Dr. Olson adjourned the meeting.

Adjourned (4:01 p.m.)